EOSDIS Core System Project

ECS COTS Deployment Plan Volume 3

April 2000

Raytheon Systems Company
Upper Marlboro, Maryland

ECS COTS Deployment Plan
Volume 3

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Preface

This document is a formal contract deliverable with an approval code 2. As such, it does not require formal Government approval, however, the Government reserves a time-limited right of disapproval (45 days) for the initial submittal. Once this document is approved, Contractor approved changes are handled in accordance with Class I and Class II change control requirements described in the EOS Configuration Management Plan, and changes to this document shall be made by document change notice (DCN) or by complete revision.

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Abstract

This is the third Volume of a document that will provide information and details associated with the upgrading of COTS products within the Earth Observing System Data and Information System (EOSDIS) Core System (ECS). This document provides information regarding products that are being upgraded or added, rationale for the upgrade, schedule for upgrade, and the process used to report weekly status. The document also provides information about the reviews and risk mitigation activities performed throughout the upgrade cycle.

Keywords: product, schedule, status, test, COTS

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1. Introduction

1.1   Identification

This document is the ECS COTS Deployment Plan for COTS products being upgraded for the period defined for Volume 3 of this document (August 2000 – February 2001), for the ECS project which is defined by Data Item Descriptions (DIDs) 335/DV1.

1.2   Scope

The "ECS COTS Deployment Plan, Volume 3" documents the ECS approach upgrading the various COTS packages described in Section 3.2. Volume 3 includes upgrades that occur during the period August 1, 2000, through February 28, 2001. This document will be updated with subsequent volumes that will provide coverage on COTS upgrades in incremental volumes specifying upgrades over a six to nine month period of time. The next volume will be Volume 4 and its coverage will begin in March 2001.

1.3   Purpose

The purpose of this plan is to provide the approach for the upgrading of the COTS products identified for Volume 3. This plan describes the process for developing, integrating, testing, and shipping all Volume 3 products including reviewing, monitoring, and providing status.

1.4   Status and Schedule

The DID 335 is a new deliverable under ECS's Contract Restructure. Volume 3 of this document will be formally delivered in April 2000. The products identified in this document were selected for delivery during the period from August 2000 through February 2001 time frame. Status on all the products will be reported on a weekly basis.

It is essential to understand that as the development progresses, some elements of this document may change, e.g. additional products may be identified for upgrade during the period specified herein for Volume 3.

1.5   Organization

Section 1 provides information regarding the identification, scope, purpose, and objectives, and organization of this document.

Section 2 provides a listing of the related documents, which were used as a source of information for this document.

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Section 3 provides the details concerning the requirements driving the COTS upgrades, the software and hardware products involved with Volume 3, as well as, the processs followed to upgrade the products. The risk mitigation procedures employed by ECS are described.

The appendices provide supplemental information for the COTS upgrade process. Appendices A, B, and C describe the test and validation process and philosophy through system test. Appendix D adds a description of the Performance Verification Center (PVC), and how it fits into the COTS upgrade process. Appendix E provides a snapshot of the Primavera schedule used to manage and oversee progress. Appendix F describes the hardware procurements and upgrade rationale. Appendix G provides the COTS status table that identifies the status of the COTS products undergoing upgrade. The last appendix, H, provides a scaled down version of the COTS Compatibility Matrix that has been developed by ECS to monitor all the COTS products for vendor support issues, version compatibility, product to product compatibility, and platform compatibility.

2. Documentation

2.1   Parent Documents

Parent documents are documents from which the ECS COTS Deployment Plan scope and content are derived.

334-CD-600	6A Science System Release Plan for ECS
334-CD-610	6B Science System Release Plan for ECS
335-CD-001	ECS COTS Deployment Plan, Volume 1
335-CD-002	ECS COTS Deployment Plan, Volume 2
423-41-01	ECS Statement of Work
423-41-02	Functional and Performance Requirement Specification for the Earth Observing System Data and Information System (EOSDIS) Core System,

2.2   Applicable Documents

The following documents are referenced within this COTS Deployment Plan for Volume 3 Upgrades or are directly applicable, or contain policies or other directive matters that are binding upon the content of this volume.

409-CD-600	ECS Overall Acceptance Test Plan for Release 6A
411-CD-600	ECS Acceptance Test Procedures for Release 6A
412-CD-500	5A Science System Release Test Report
SE-1-025	COTS Software Upgrade Process, ECS Project Instruction
TT-1-001	Test Preparation, Execution, and Documentation, ECS Project Instruction

2.3 Information Documents

2.3.1 Information Documents Not Referenced

The following document(s), although not referenced herein and/or not directly applicable, do amplify or clarify the information presented in this document. These document(s) are not binding on the content of this volume.

101-CD-001 Project Management Plan for the ECS Project

3. Details

3.1 Overview

This section first summarizes the primary upgrades to the ECS COTS products that will be implemented during the period covered for this third volume of the DID 335. The COTS products being upgraded and deployed during the period covered by this volume are being upgraded during portions of both the 6A and 6B System Release time frame.

3.2 Requirement

The COTS product identified in conjunction with this COTS Deployment Plan, Volume 3, are being upgraded for several reasons. The reasons/requirements for this group of upgrades include:

- Termination of vendor maintenance support for the current version in use.

- To resolve error conditions or unsatisfactory performance.

The technical information regarding each product, vendor, current version, dependency with other products, and platform dependencies is maintained in the ECS COTS Compatibility Matrix. This matrix plays a major role in the COTS upgrade process. A subset of the matrix is provided in Appendix H.

3.3 COTS Products Upgrades

3.3.1 The Software COTS products Allocated to Volume 3

The software COTS products included in Volume 3 are listed in the COTS Status Table. This table is included in Appendix G.

3.3.2 The Hardware COTS Products Allocated to Volume 3

During the Volume 3 timeframe, there are several main hardware purchases planned, driven by the F&PRS requirements, and PM-1 support, for each DAAC.   The upgrades fall into the following areas:

- FTP User Pull RAID disk capacity upgrades for electronic distribution. The upgrade is on hold per TD 64 and TD65

- Science Data Server processor upgrades from SGI Challenge machines to SGI Origin class machines and associated RAID. This upgrade is on hold per TD 64 and TD65

- Science Processor additions of SGI Origin class machines and/or RAID additions.

- Archive processor upgrades from SGI Challenge machines to SGI Origin class machines and associated RAID; and some SUN server/workstation additions.

- Distribution additions of DLT drives/Libraries; and 8-mm tape drives, CD-ROM, and DLT media as necessary. This upgrade is on hold per TD 64 and TD 65

See Appendix F for full details.

3.4 Process

This section provides the description of the activities necessary to perform the upgrades, and verify and revalidate the system operations and performance. This section provides an overview of the COTS Upgrade PI (ref: ECS PI SE-1-025).

The procedures covering the life cycle of upgrading a COTS product are depicted in the ECS COTS Upgrade Process figure, Figure 3.4-1. The process includes the requirements process that will initiate an upgrade activity, the reviews and sign off review boards utilized along the way as checkpoints/milestones to insure accuracy, adequate verification, and coordination with all ECS segments, customer activities, and DAACs that will be the recipient of the upgrades.

The upgrade process for a product is initiated when the COTS Core Team authorizes the upgrade of a product. This will be started when the COTS Core Team receives such a request from one of the following: The COTS Compatibility Matrix Engineer, SED Architect's Office, Technical Security Information Working Group (TSIWG), COTS Core Team, or the NCR Board.

The CCR process is the key activity providing the reviews/system checks to insure performance and system validation standards are met. With the procurement of the upgrade, the introduction of the upgrade into System Developments domain for installation, analysis, and test within the IDG Cell and the Functionality Lab is initiated. RTSC is responsible for all installations throughout the upgrade process. Upon satisfaction through Development, the product is ready for transition to Test Engineering within the VATC. Test Engineering selects the appropriate tests from the System VDB. Satisfactory completion of the VATC activities results in the product being prepared for a Pre-Ship Review (PSR). The PSR package verifies that all testing and performance milestones have been met, installation instructions prepared and checked out before the product is released for delivery to the customer. The PSR package will also contain descriptions of any system reconfigurations and or changes to data items or data bases. In addition, should the upgrade be tied to any NCR's, the PSR package will note satisfactory demonstration of the NCR tests. A release CCR is generated to accomplish this release. ECS PI CM-1-005 describes the turnover and installation of COTS procedures. However, should a security emergency patch be required, testing in the VATC may be bypassed to expedite delivery and installation to the appropriate site(s).
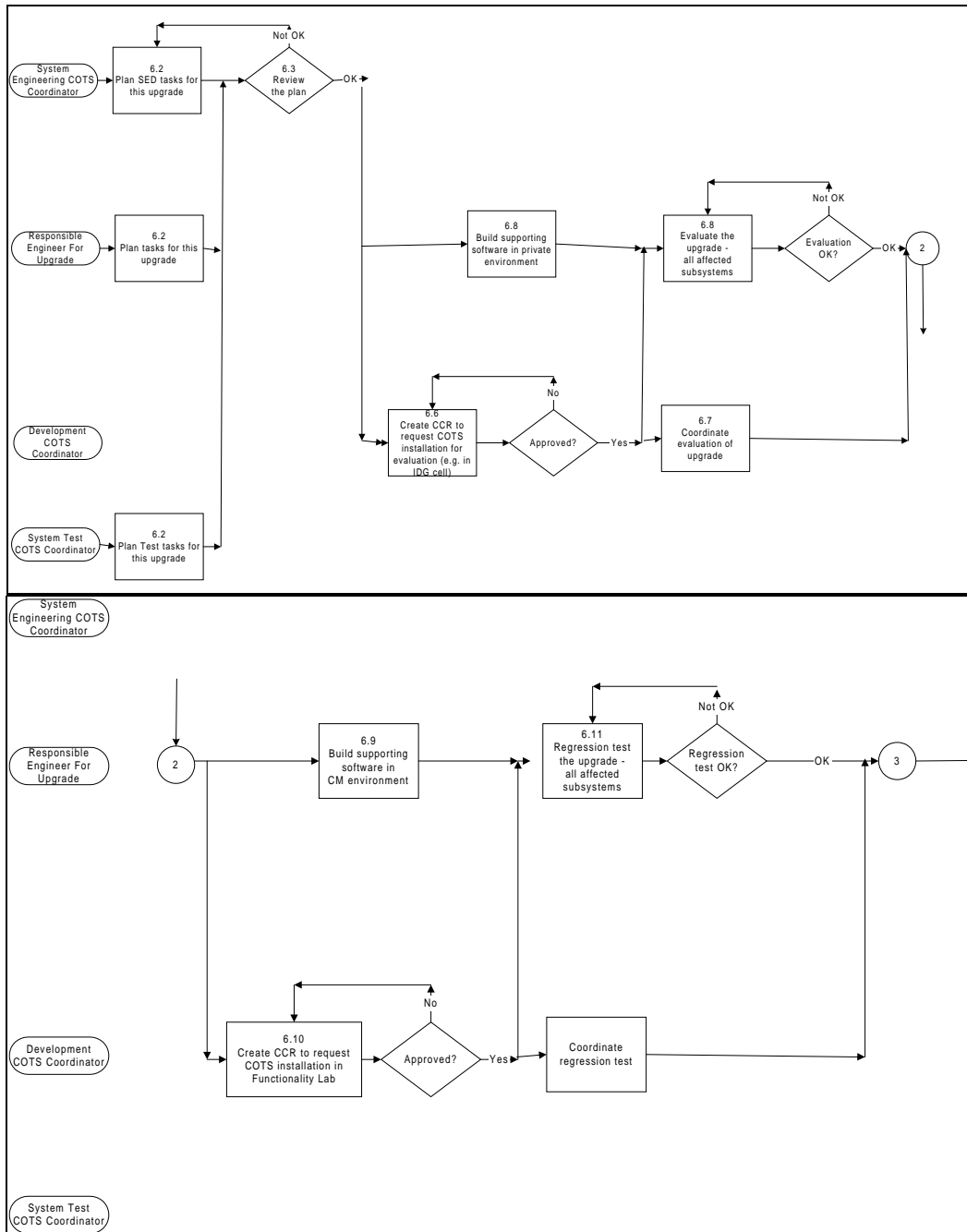
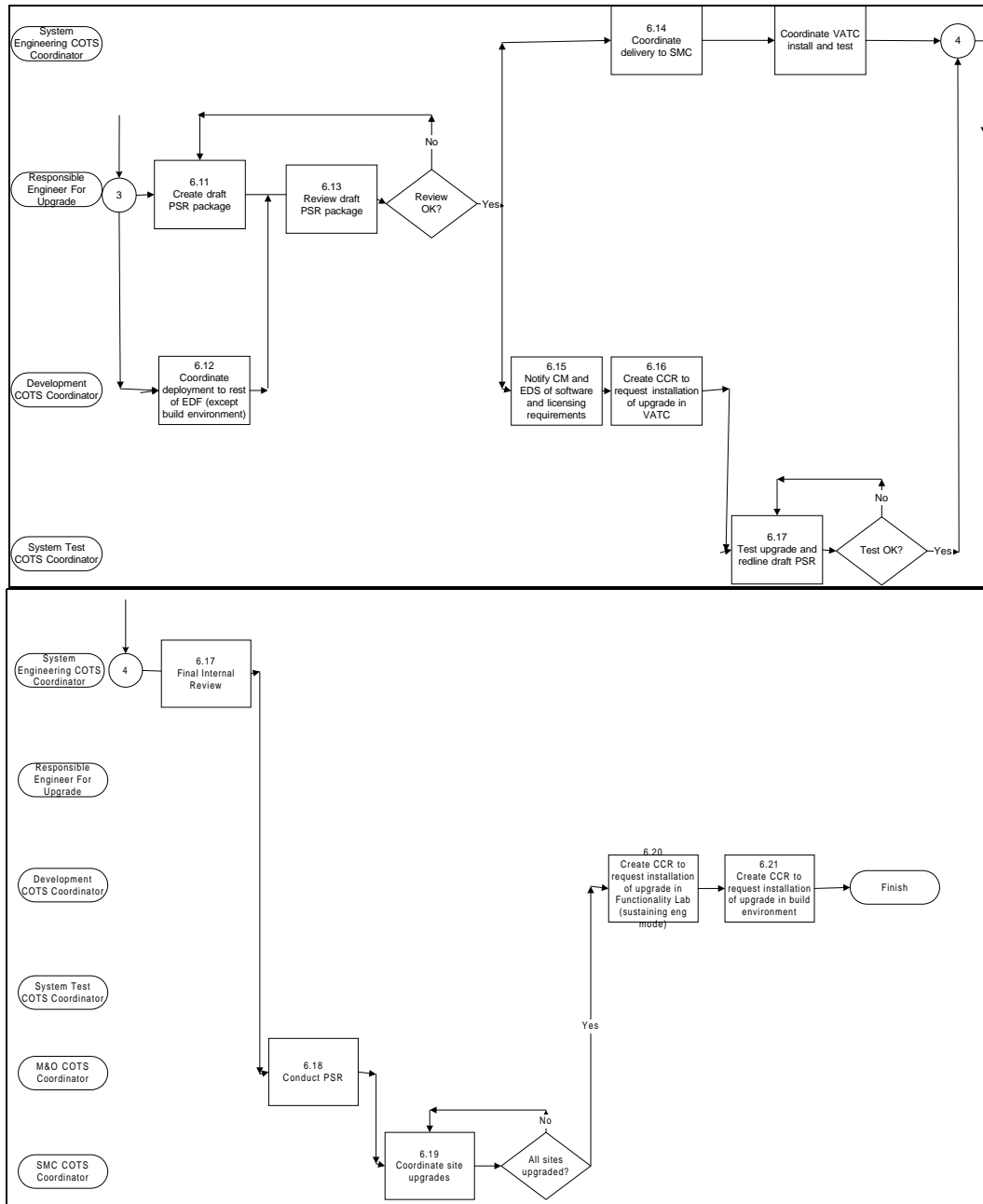**Figure 3.4-1. COTS Life Cycle Process**

Figure 3.4-1. COTS Life Cycle Process (Continued)

3.5   Planned Upgrades:

The COTS upgrades are listed in the COTS Status Table. This table is updated weekly and briefed to management and the customer and is part of System Engineering's weekly status report. This chart details progress of each product from procurement to the PSR.

The deployment to the DAACs is performed from the SMC electronically. The table is contained in Appendix G, The COTS Status Table.

3.6   Test Approach

The Test Engineering organization and/or the System Development organization develop or have an existing set of test cases that test the COTS upgrades. COTS upgrades are delivered in various ways – some COTS software packages are delivered with the ECS custom software and have an associated Ticket (including acceptance criteria), and some are delivered as autonomous upgrades to existing COTS software packages that are not part of the custom software.

For each COTS package having an associated Ticket and delivered along with the ECS custom software, Test Engineering, via established process, develops new test cases. For each COTS software upgrade having no associated Ticket, regression testing is performed using existing test cases. If a regression test case does not yet exist, the System Development organization or Raytheon Technical Services Company (RTSC) engineers develops and provides the test case.

3.6.1 System Verification Process

For a new COTS software package having an associated Ticket, the acceptance criteria (acceptance criteria are specified in Tickets, which are requirements and acceptance criteria specifications) are allocated to an acceptance test. This test case is written to exercise the COTS software in such a way as to demonstrate satisfaction of all allocated acceptance criteria. The mapping between Tickets and test cases is captured in the Verification Database (VDB), along with the associated requirements and acceptance criteria. Test Engineering documents a summary of each test case in the Science System Release Acceptance Test Plan (DID-409), which is reviewed and approved by ESDIS.

The initial development of a test case starts when a draft Ticket is released. Test Engineering develops the each test case in accordance with established practices, processes, and procedures and formats. The test cases are refined as the Tickets are finalized and approved by the ESDIS. ESDIS also reviews and approves each test case that has associated acceptance criteria. Each test case identifies the steps for verifying the acceptance criteria. Upon approval of one or more test cases, Test Engineering generates a CCR to baseline the mapping of test procedures to acceptance criteria until all mappings are baselined. Any changes to the mappings are under CCB control. ESDIS-approved test cases form the Science System Release Acceptance Test Procedures (DID-411)

At the completion of Custom Software Release Integration and release to Test Engineering, and prior to start of formal verification, an internal Test Readiness Review (TRR) is held. An assessment of readiness is made with regard to software and integration status, test facility and configuration status, and test status (including approved test cases, supporting data and tools, and available resources). After a successful TRR, Test Engineering dry runs and conducts formal tests to verify satisfaction of the COTS software acceptance criteria.

As-executed test cases and problem workarounds are documented as a result of test case dry run and formal conduct, recorded on the test execution forms. Test Development Folders (TDFs) are created for each test case and maintained throughout the test program. Each test activity is

recorded on Test Execution Forms and filed in their individual test folders. During the verification process, discrepancies are noted on the Test Execution Form. Workarounds to circumvent system deficiencies found during testing are also recorded on the test execution forms for the TDF of the test case that uncovered the deficiency. Discrepancies (and workarounds, if available) are then recorded on NCRs, rated by the test engineer according to severity, and filed in DDTS. TDFs are returned to a secure location, under configuration control, after completion of each test session. Each TDF may be subjected to an audit to ensure completeness and accuracy. TDF audits are conducted routinely by the ECS Quality Office in accordance with ECS Project Instruction TT-1-001. After the audit results are discussed with Test Engineering personnel, they are posted on the Test Engineering web page. If necessary, a corrective action may be assigned, and the TDF is re-audited after the corrective action is addressed. The audits are designed to ensure compliance with test folder requirements, as specified in TT-1-001, and to assist in the successful completion of the Functional Configuration Audit (FCA).

The preparation of test results begins with the routine recording of test case execution results on the Test Execution Form maintained in the TDFs, and continues with their incorporation into the TDFs, DDTS and the VDB. This information forms the basis for the preparation of acceptance test results into a Science System Release Test Report (DID-412).

3.6.2 Regression Testing

For each COTS software upgrade (which do not have associated Tickets and acceptance criteria), the Test Engineering organization executes one or more regression tests to exercise system functionality and the COTS software upgrade package. Additionally, other major ECS functions may be exercised during this regression testing. This provides confidence that the COTS package upgrade has not adversely affected the behavior of unmodified software and the COTS supports system needs.

RTSC engineers install in the VATC, configure and checkout all COTS package upgrades. Thereafter, the ECS Test Engineering organization executes one or more regression tests to exercise system functionality that interfaces with, depends upon, or otherwise utilizes the COTS package.

Satisfactory completion of the VATC testing activities results in the product being prepared for a Pre-Ship Review (PSR). The PSR verifies all testing and performance milestones have been met, installation instructions prepared, and checked out before the product is released for delivery to the customer. A CCR is generated to accomplish this release. Upon approval of the CCR, The ECS CM office delivers the media to SMC for distribution to the DAACs in the case of electronic delivery, or mails the CD's directly to all sites.

3.7   Risk Mitigation Plans

3.7.1   ECS Risk Management Approach

To achieve balance in technical, cost, and schedule performance, the ECS project emphasizes risk identification and management. This section describes the program's approaches to this critical process.

PM-1-002, the Risk Management Methodology (a Project Instruction) provides the details of ECS's risk management process. This process is composed of four stages. This section provides a brief and high level description of the four stages.

<u>Stage 1, Risk Identification</u> - Risk items will be identified over the course of the Program from routine ECS activities and recorded on the Program risks list.

Any ECS personnel can identify risks with potential technical, cost, or schedule impacts and report to the management. The Management will then designate a "Responsible Individual" to lead all activities related to that particular risk. Identified risks will be moved to the Risk Assessment stage of the Risk Management Process.

<u>Stage 2, Risk Assessment</u> - Detailed analyses of the identified risks and associated drivers are performed by the Responsible Individuals.

The analyses are conducted to discover the causes, effects, and magnitude of perceived risks. They consist of determining the probability of potential risk occurrence (probability of occurrence, P_f) with respect to design maturity, system complexity, and dependency variables and evaluating all technical, cost, and schedule consequences (consequence of failure, C_f) caused by the potential risk.

<u>Stage 3, Risk Mitigation</u> - In this stage, Program Management evaluates various mitigation alternatives presented by the Responsible Individual for cost, impact, effectiveness, and feasibility and approves a mitigation plan for implementation.

The mitigation plan identifies details of mitigation activities with schedules and the supporting organizations. It also provides detailed actions with schedules for completion.

For highly significant risks, contingency plans may also be developed and documented during this stage; contingency plans address the situation where the selected mitigation might fail, and provide for documented alternate courses of actions.

<u>Stage 4, Risk Monitoring</u> - After approval of a mitigation plan for implementation, the risk management team will periodically review the status of the related risk action items and assess their progress via risk meetings. If there is any indication of an increase in the severity of the risk, the risk is referred back to the mitigation stage for further option analysis. In addition, risk metrics (impacts and probabilities) are reviewed and updated periodically.

3.7.2 Cost/Schedule Management

The status of each COTS product plan is tracked and monitored in the Primavera Scheduling plan, and weekly COTS status meeting. This status is documented on the COTS status report (Appendix G) and reported to management and the customer (ESDIS) on a weekly basis.

3.7.3   Metrics Driven Management Approach

Metrics are used as a management tool to assess progress, adjust resources, and aid in the delivery of ECS/SDPS. Metrics include: the rate of discovery of problems or issues, the rate of changes in code, and the rate of new code being developed. These rate metrics provide trends that predict system stability and help identify additional potential resource needs. The Program Manager will maintain a sustained emphasis to continually improve the data collection, analysis and presentation of the relevant metrics of the project.

Selected metrics presentation charts and their updates will be included in the weekly reports to the customer and also made a part of the monthly program report.

Metrics delivered each week include:

    A) COTS weekly status report (Appendix G)

    B) COTS Primavera schedule (Appendix E)

    C) Deployment Drop Tracking Matrix

    D) COTS Weekly NCR Status Report

Appendix A. Tests/Validation Philosophy for the IDG Cell

The IDG Cell is controlled and operated by the Infrastructure group of the Development Department. The purpose and the objectives of testing the COTS product in the IDG cell are to perform the first level of validation for the upgrade. To do this, the IDG Cell will perform unit level type testing on each of these products. These tests will utilize test drivers, and test data as appropriate. The testing may test to a single subsystem level. The objectives of IDG Cell level testing is to demonstrate the products specific interfaces. This testing is characterized as 'Pre-Integration Testing'.

Detailed test plans and procedures will be developed by the assigned Responsible Engineer (RE) subsequent to the COTS product upgrade kickoff meeting. These test plans and procedures will be validated and approved and form the basis for approval to move to the next level of testing and validation. Eventually, the test plans and procedures are enhanced by the RE to become the testing criteria for the Functionality Lab verification/validation during integration testing.

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Appendix B. Tests/Validation Philosophy for the Functionality Lab

The Functionality Lab is controlled and operated by the Construction group of the System Development Department.

The Functionality Lab will perform regression tests on each of the products selected for upgrade. These tests will be configuration specific, interact with executables, and have specific scenarios or test cases run against them. This level of testing will verify the performance of the product at the subsystem level. The test procedures are updated and validated by the RE. These test procedures are provided to the Testing Engineering group to create the testing criteria for the verification/validation during installation in the VATC and at the appropriate customer facilities. Additionally, a CCR is prepared to hand the product and test procedures off for system testing in the VATC.

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Appendix C. VATC Testing/Validation Philosophy

VATC Mission:

System Engineering has implemented a Verification and Test Center (VATC) at the Landover, MD, facility. The VATC provides a DAAC-realistic test platform and environment for hosting ECS software releases, where ECS software can be installed, checked out, regression tested, or otherwise exercised and/or formally acceptance-tested in isolation prior to deployment in accordance with ECS Acceptance Test Plans and Science System Release Plans. VATC testing also includes verification and regression testing of patches to deployed software prior to release to the DAACs.

COTS in the VATC:

The VATC configuration is a controlled environment, which is maintained by Test Engineering and audited by CM. Formal testing performed in the VATC relies on tight control of versions of software to achieve repeatability. This control is achieved through processes defined by the ECS Configuration Control Board (CCB). COTS software packages are a major component of the configuration, included with ECS custom software or as upgrades to existing COTS software.

Test Engineering:
- Develops testing schedules and plans for the overarching test program
- Verifies new or upgraded COTS products installed in the VATC
- Reviews new/upgrade product lists
- Develops/updates detailed test procedures as required for COTS products not covered by existing test procedures
- Executes specific acceptance tests with ECS test data to verify product function and satisfaction of acceptance criteria associated with new COTS software
- Regression tests COTS software upgrades to verify product function and build confidence that unmodified software has not been adversely affected
- Documents test results with test execution forms and Non-Conformance Reports (NCRs)
- Support Pre-Shipment Review (PSR) and Consent-To-Ship Review (CSR).

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Appendix D. Performance Verification Center Philosophy

Performance Verification Center (PVC): System Engineering and ECS have implemented a PVC at the Landover facility, that provides a DAAC-like realistic environment for hosting ECS releases, with a comprehensive suite of hardware and ability for input, output and storage load simulation. End to end scenarios are performed in the PVC facility to demonstrate functional integrity for internal interfaces and to validate performance per the SSRP Workload Specification. External interface testing is conducted to the extent possible in each test environment under conditions that simulate operational activities.

COTS in the PVC: The PVC configuration is a baseline controlled environment which is maintained and audited by CM. The analysis performed in the PVC relies on tight control of versions of software to achieve repeatability. This control is achieved through processes defined by the ECS CCB. COTS packages are a major component of the configuration. The general desire is to run performance tests on a configuration equivalent to an actual DAAC, using COTS versions which have been PSR'd and released to the field. However, there are some occasions where the SECC determines that a COTS package may present a performance impact, or where a version change is required to support performance testing of a new release or patch. In this case, the COTS package may be CCR'd for installation into the PVC in advance of the PSR. As such, the PVC may be in a configuration ahead of the operational baseline at the DAACS.

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Appendix E. Schedule for Volume 3 COTS Upgrades

Primavera Schedule with all the activities and milestones for the COTS products assigned to this volume. The actual Primavera plan for the products listed for upgrade during the time period specified for this volume, has not been completed. The process and activities that will be contained for each COTS product is reflected in a COTS upgrade template. Below is the template used to plan a COTS upgrade. This template was developed by Systems Engineering and Development to ensure a better picture of the actual process required to conduct an upgrade. All key steps and activities are included. Coordination in developing this template was made with M&O, Test, and other members and participants of the weekly CUT meeting.

Table E-1. Primavera Schedule Template for COTS Upgrade Planning (1 of 2)

ID	Task Name	Pred	Lead	Other	Task Description
1	System Analysis		SE	DEV, INFR	This task includes: determining the requirement (driven by DEV or from COTS), need date, and scope of COTS usage i.e. only in DEV labs or everywhere.
2	Acquisition of COTS XYZ	1	SE	IDS	This task will ensure acquisition of the COTS by IDS and monitored by SE.
3	**COTS XYZ Available for Development**	2	SE	CM	This turnover milestone by SE will let DEV know that COTS is available.
4	Generate CCR for IDG cell		DEV	CM	DEV can start the CCR process way in advance so that as soon as SE makes the COTS available they can use the CCR to trigger the installation process
5	Install in IDG cell	3,4	IDS	DEV	After IDS gets the CCR they will start the Install process. Since they already have an activity in P3 they will know when to expect the CCR
6	Testing in IDG cell	5	DEV		After IDS installs the COTS in IDG cell DEV can start their testing.
7	Generate CCR for Functionality lab		DEV	CM	DEV can start the CCR process way in advance so that as soon as the testing in IDG cell is successful they can use the CCR to trigger the installation process
8	Install in Functionality lab	7	IDS	DEV	After IDS gets the CCR they will start the Install process. Since they already have an activity in P3 they will know when to expect the CCR
9	Testing in Functionality lab	8	DEV		After IDS installs the COTS in Functionality lab DEV can start their testing.
10	Testing of COTS XYZ in Development complete	6,9	DEV		This DEV internal milestone indicates that all the required testing for the COTS is complete.
11	Draft copy of the COTS PSR document		DEV	INFR	This document will be written by DEV based on the format generated by SE and input from IDS
12	**COTS XYZ turnover to System Test**	10, 11, 12	DEV	SE, ST, INFR, M&O	This DEV milestone indicates that all the required testing in development for the COTS is complete, draft copy of the PSR document is done, and the COTS is ready for ST.
13	Generate CCR for VATC		ST	CM, DEV	DEV can start the CCR process way in advance so that as soon as the testing in development is successful they can use the CCR to trigger the installation process

Table E-1. Primavera Schedule Template for COTS Upgrade Planning (2 of 2)

ID	Task Name	Pred	Lead	Other	Task Description
14	Install COTS XYZ in VATC	13	IDS	ST	After IDS gets the CCR they will start the Install process. Since they already have an activity in P3 they will know when to expect the CCR
15	**XYZ COTS upgrade test**	14	ST		As soon as IDS installs the COTS in VATC ST can start their testing.
16	**XYZ Final PSR Doc Review W/O**	13, 14	DEV	SE, ST, INFR, M&O, CM	This document will be written by DEV based on the input from ST and IDS. This task includes different revisions of the document (if required) based on comments received from SE and M&O.
17	**XYZ: COTS turnover to M&O**	15, 16	SE	DEV, ST, INFR, M&O, CM	SE will recognize the successful testing of COTS in VATC and also completion of COTS PSR doument and turns over to M&O. M&O takes it from here on.
18	Walkthrough for COTS XYZ	17	M&O		
19	**COTS PSR for XYZ**	18	M&O		

NOTE:
1. Please maintain the wording of the turnover milestones identified in **bold**
2. All activities from 4 to 12 are at the discretion of DEV. In case of few COTS all the testing may not be required.
3. All activities between 14 and 16 (one or more than one) are at the discretion of ST
4. All activities from 18 onwards are at the discretion of M&O.

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Appendix F. Hardware Procurements and Rationale

PURCHASES/UPGRADES FOR AUG 00 – FEB 01

Science Data Server - On Hold

FTP User Pull RAID Capacity Upgrades

ECS plans to acquire the FTP User Pull Disk upgrades for GSFC, LaRC, and NSIDC for the Nov99 – Jul00 timeframe, as well as the rest of the upgrades for FTP User Pull disk out through 2002. FTP User Pull upgrade disk for EDC, for 1999 through 2002 was already purchased as one of the Early Buy items.

Upgrades to the disk space on the Access Control & Management Hardware Subsystems (ACMHW) at the DAACs with regard supporting electronic distribution of data was determined using Table C-2, User Distribution Rates via Network and via Physical Media, of the F&PRS Rev. C. The table shows the GB/day distribution rate via the network for each topic for each DAAC. For purposes of disk space requirements, the numbers in this table were multiplied by two, so that each DAAC would have the equivalent of two days worth of disk storage available for housing User Pull data.

The calculations were derived by purchasing GB of disk space as needed, per year Topic, and accumulating the GB's as they are purchased and rolling them into the calculations for the following year. As part of the rolling calculations, current GB's on the floor for User Pull are taken into account. A standard assumption is that 9GB disk will be the form factor for calculating the number of disks needed, however, this is dependent on each DAAC. For instance, in calculating GSFC requirements, an 18GB disk is used as the form factor. Because these disks will be part of RAID units, an overhead of one RAID disk in five is used to support RAID parity information. Also, as GB's of space are calculated, disk controllers and racks are also required to be purchased as necessary.

ACMHW Processor Upgrades

For the ACMHW suite at the GSFC and EDC DAACs, upgrades were derived based on ECS calculations of processing requirements and data volumes for the ECS system, during AM-1, but especially when PM-1 processing begins. By the time of PM-1 launch, the design forecasts the splitting of the processing load in the ACMHW subsystem by mission. In other words, having one SGI/SUN pair of machines allocated to AM-1 data processing and another pair dedicated to the PM-1 data processing.

The current ACMHW suite of machines contains SGI Challenge class servers. The current plan is to purchase an SGI Origin class machine to replace the SGI Challenge class machine for AM-1 processing, and purchase an SGI Origin class machine to handle the new PM-1 processing load. Appropriate Origin machines for failover will be purchased as well. The additional SUN server purchased at each site would be a SUN

Enterprise class machine (to complete the PM-1 SGI/SUN pair). Any SGI Challenge servers replaced at either GSFC or EDC as a result of the Origin purchase can be redeployed for other purposes.

Science Processing

The SPRHW suites at the GSFC, LaRC, and EDC DAACs will be upgraded as follows: On Hold

GSFC: SGI Origin class machine and associated RAID.

EDC: RAID storage upgrades

LaRC: SGI Origin class machine and associated RAID

These upgrades to the Science Processing suites were derived based on ECS calculations of processing requirements for the ECS system, during AM-1, but especially when PM-1 processing begins.

Archive

The DRPHW suites at the GSFC, LaRC, NSIDC, and EDC DAACs will be upgraded as follows: Note - May be reduced to meet Fy 00 spending limits.

GSFC: SGI Origin class machines and associated RAID, and a SUN Ultra 60 Server.

EDC: SGI Origin class machine and associate RAID, and two Archive drives.

LaRC: SUN Ultra 60 Server and Sun Ultra 10 workstations, D3 Media

NSIDC: One SUN Ultra 60 Server.

These upgrades to the Data Repository suites were derived based on ECS calculations of data volumes for the ECS system, during AM-1, but especially when PM-1 archiving begins.

Distribution

The DIPHW suites at the GSFC, LaRC, NSIDC, and EDC DAACs will be upgraded as follows:

GSFC: Six DLT drives; and 8MM tape, CD-ROM, and DLT media as necessary. On hold

EDC: Two STK 9730 DLT Library; six DLT Drives; and 8MM tape, CD-ROM, and DLT media as necessary. On hold

LaRC: One STK 9730 DLT Library, and 8MM tape, CD-ROM, and DLT media as necessary. On hold

NSIDC: Two STK 9730 DLT Library; four DLT Drives; and 8MM tape, CD-ROM, and DLT media as necessary. On hold

These upgrades to the Data Repository suites were derived based on ECS calculations of distribution requirements for the ECS system during AM-1.

ASF DAAC

ASF DAAC is cancelled. Planned purchases for ASF DAAC are deleted.

ORNL DAAC

ORNL DAAC is cancelled.

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Appendix G. COTS Status Table

The COTS status table is presented to management and the customer on a weekly basis. The table is updated weekly in a working session with Development, M&O and System Engineering. This information is then distributed to key personnel throughout the program. The COTS status table with the products that have been identified for upgrade during the period covered by this volume is shown below:

Table G-2. Weekly COTS Upgrade Team Status Table

Product Name	Baseline Version	Planned Upgrade Version	Custom Code Required	Upgrade Rationale	Associated NCRs	Turnover to Development	Turnover to Test Date	Turnover to M&O date	PSR Date	Slipped PSR Date	Subsystem Impacted	Custom Code Usage	Status (Date)
PRODUCTS FOR 6A AND BEYOND													
DDTS	4.1	4.5.1	6A	Vendor Support - end of life est. to be 4/01/2000							MSS		Needs to be planned.
Legato			6A	Customer request	ECSed24361 ECSed25042								Needs to be planned.
ReelRobot SRI	N/A	8.1b	6A	Replaces Exabyte Driver which is no longer provided by Exabyte							SDSRV		*03/01*: Reviewing procurement options
Sybase ASE 11.9.3	11.5.1	11.9.3	6A	Vendor Support							All		Needs to be planned.
Clearcase for HP	3.1.1	3.2.1	6A	Needed for upgrades and version consistency across platforms							MSS, SED-CM in Landover	None	Needs to be planned.
Clearcase for Solaris	3.1.1	3.2.1	6A	Needed for upgrades and version consistency across platforms							MSS, SED-CM in Landover	None	Needs to be planned.
Solaris OS	2.51	2.7	6B	Vendor Support									*03/01*: Need to identify the risks involved if we upgrade and if we do not upgrade the OS
Security Software	N/A	N/A	6B	Possible replacement of freeware security software to supported COTS products							All		Needs to be planned.
XVT DSC	4.58	? 5.0	?	Vendor Support							CLS		*03/01*: Will not be upgraded

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Appendix H. COTS Compatibility Matrix

The COTS Compatibility Matrix is a Microsoft Access Database that captures information needed for planning upgrades to COTS products, including operating system products. Information is available from the COTS Compatibility Matrix on current COTS/Freeware products as well as future product versions. The COTS Compatibility Matrix is utilized by the COTS Core Team for planning and verification purposes, and is presented at the CUT Weekly Status Meeting as needed. The information is updated quarterly. The COTS Compatibility Matrix provides information on the following key area related to COTS Upgrade Planning:

- Current Products End-of-Life and End-of-Support dates to identify when a product is recommended to be upgraded because of vendor support levels.

- Future Product versions, with associated availability dates, and OS platform support.

- Dependency information identifying if an OS version, database version, compiler version, other COTS product, etc., is required to be considered in planning the upgrade.

- Y2K information on products.

The Table below depicts a snap shot of the COTS Compatibility Matrix, depicting the COTS products that have been identified to date to be upgraded during the time frame covered by this version of the document. The table is organized with columns selected to show the product title, version, deployment category, SW type, End-of-Life date, End-of-Support date, and dependencies. The remainder of the information about each product was not selected for this report. The Microsoft Access Database provides a lot of flexibility in grouping data/information about the products in a relational form.

Sample COTS Compatibility Matrix Report

Product	Upgrade Version	Deployment	SW Type	Upgrade Rational	COTS Dependencies
BDS	2.1	OPS	COTS	required for OS upgrade	OS/HiPPI SW/NFS
ClearCase	3.2.1	OPS	COTS	OS upgrade for IRIX 6.5; Sun/HP to follow	OS/GNU Make compatibility
DBTools.h++/CT.lib	3.1.4	OPS	COTS	Vendor support	OS/Sybase OpenClient/Tools.h++/OS C++ compiler versions. See Comment
DCE Client for SGI	1.2.2a	OPS	COTS	OS versions support a default DCE version /OS upgrades include a "virtual" DCE upgrade	OS/OSF DCE Version/DCE Cell Manager
REELRobot SRI	8.1B	OPS	COTS	Exabyte Driver is discontinued product	OS
HDF Libraries	4.1r3	OPS	Freeware	IRIX 6.5 upgrade	OS
HiPPI SW	3.3.1	OPS	COTS	Required for SGI IRIX 6.5.x upgrade	OS/BDS/NFS; parrallel/serial interfaces
IMSL C Numeric Libraries	3.01	OPS	COTS	Required by SGI 6.5.x upgrade	OS/SGI Compilers
IMSL Fortran Numeric Libraries	4.01	OPS	COTS	Required by SGI 6.5.x upgrade	OS/SGI Compilers/HP RISC implemenation
IQ (VISION:Query)	5.5.01	OPS	COTS	Support for DAAC reporting requirements	OS
ToolsPro.h ++	1.02	OPS	COTS	Net.h product no longer offered separately	OS/Tools.h++/OS C++ compiler versions
Netscape Communicator	4.7	OPS	COTS	OS upgrades/vendor support	OS
OpenView Network Node Manager	6	OPS	COTS	Vendor support	OS
PERL	5.005-03	OPS	Freeware	NCR resolution/Y2K	OS
Purify	4.5.1	OPS	COTS	IRIX 6.5 upgrade/Vendor support	OS/C++ Compilers

Name	Version			Comment	Dependency
SPARCompiler C	4.2	OPS	COTS	Vendor support/Y2K	OS
SPARCompiler C++	4.2	OPS	COTS	Vendor support/Y2K	OS
ssh secure shell commercial	2.0.13	OPS	COTS	OS upgrade & vendor support	OS
Sybase Adaptive Server	11.5.1	OPS	COTS	Vendor Support	OS/Sybase OpenClient/Sybase Replication Server/Sybase Central/SQS/SQL Monitor/DBVision/Autosys/SQR/DB Tools/PowerDes/Tivoli/IQ/Remedy/DBArtisan
Sybase Central	3.0.0	OPS	COTS	Bundled with most recent Sybase version	OS/Sybase ASE version/OpenClient Version
Sybase Open Client/C for HP	11.1.1	OPS	COTS	vendor support/version consistency/required for 11.5 upgrade	OS/Sybase Adaptive Server/DCE Threads on OS
Sybase Open Client/C for Sun	11.1.1	OPS	COTS	vendor support/version consistency across all platforms/required for 11.5 upgrade	OS/Sybase Adaptive Server/DCE Threads on OS
Sybase Replication Server	11.5.1	OPS	COTS	Sybase ASE compatibility	OS/Sybase Adaptive Server
Tools.h ++	7.0.b	OPS	COTS	Vendor support	OS/Tools.h++/OS C++ compiler versions
ToolsPro.h ++	1.02	OPS	COTS	net.h++ product currently available only in Tools.Pro++.	OS/Tools.h++/OS C++ compiler versions
Visual Workshop C++	3	OPS	COTS	Vendor support/Y2K	OS/Versioning of stand-along SPARCompilers

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